Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1 – 39. (Canceled)

40. (Previously Presented) A sputtering power supply unit comprising:

a sputtering DC power source for supplying DC power to a sputtering apparatus;

a switching unit connected across terminals of the sputtering DC power source;

at least one choke coil serially connected between the switching unit and the sputtering apparatus;

a current detection unit for detecting a current supplied to the sputtering apparatus from the sputtering DC power source via the choke coil;

a voltage detection unit for detecting a voltage across power source terminals of the sputtering apparatus;

a controller outputting a switching signal when a voltage corresponding to an arc discharge generated inside the sputtering apparatus is detected by the voltage detection unit;

a first switch which is closed by the switching signal;

a reverse voltage source for supplying via the first switch a reverse voltage across the power source terminals of the sputtering apparatus for stopping the arc discharge;

means for calculating an instantaneous power supplied to the sputtering apparatus from the voltage detected by the voltage detection unit and the current detected by the current detection unit;

integration means for generating an integration output obtained by integrating a difference value between the instantaneous power obtained in the calculating means and a predetermined set power;

means for generating a pulse output having a pulse width corresponding to a difference between a current set value formed on the basis of the integration output and the current detected by the current detection unit;

means for on/off controlling the switching unit according to the pulse output from the generating means;

means for stopping the instantaneous power from being supplied to the integration means when the first switch is closed in response to the arc discharge; and

means for controlling the current supplied to the sputtering apparatus by on/off controlling the switching unit using the pulse output generated from the pulse outputting means in accordance with an integration output held in the integration means when the supply of the instantaneous power to the integration means is stopped by the stopping means.

41. (Previously Presented) A sputtering power supply unit according to claim 40, further comprising a reverse-direction arc prevention circuit connected between one end of the first switch and one of the power source terminals of the sputtering apparatus.

42. (Previously Presented) A sputtering power supply unit according to claim 40, wherein the pulse output generating means comprises a comparator having a hysteresis characteristic and configured to compare the current set value

formed on the basis of the integration output obtained in the integration means and the current detected in the current detection unit, and means for on/off controlling the switching unit in response to a comparison output of the comparator.

43. (Previously Presented) A sputtering power supply unit according to claim 40, wherein the pulse output generating means comprises an operational amplifier for performing a calculation,

Iset*L-CM*L+VM*T

wherein Iset denotes the set current value based on the integration output obtained from the integration means, CM denotes the current value detected at the current detection unit, VM denotes the voltage value detected at the voltage detection unit, and L denotes an inductance of the choke coil;

a division circuit which divides an output value of the operational amplifier by an output voltage of the sputtering DC power source; and

a driving circuit for outputting the pulse output in accordance with a division output of the division circuit.

44. (Previously Presented) A sputtering power supply unit according to claim 40, wherein the sputtering DC power source comprises a first rectifier circuit for rectifying an alternating power source voltage to a DC voltage, a switching circuit for converting the DC voltage from the first rectifier circuit to a pulse voltage, and a pulse transformer having a primary coil supplied with the pulse voltage and a secondary coil connected with a second rectifier circuit;

the switching unit comprises a plurality of switching elements for supplying the DC voltage rectified by the first rectifier circuit to the primary coil of the pulse transformer as an alternately reversing pulse voltage at a predetermined interval of time as the pulse voltage;

the at least one choke coil is serially connected between one output terminal of the second rectifier circuit provided at the secondary coil of the pulse transformer and one of the power source terminals of the sputtering apparatus; and

the reverse voltage source comprises an auxiliary rectifier circuit rectifying an alternating voltage generated at the secondary of the pulse transformer, and a capacitor connected to be charged with a DC voltage supplied from the auxiliary rectifier circuit.

45. (Previously Presented) A sputtering power supply unit according to claim 44, wherein the pulse output generating means comprises a sample/hold circuit for sampling/holding a division output from the division circuit, a pulse generation circuit for generating the pulse signal having a pulse width corresponding to an output of the sample/hold circuit being supplied to the switching circuit, and a timing circuit for determining a sampling period for the sample/hold circuit.

46. (Previously Presented) A sputtering power supply unit according to claim 44, which further comprises a primary current detection circuit for detecting a current flowing in the primary coil of the pulse transformer, and means for stopping the pulse output from the pulse output generating means when a value of the current is larger than a limit value for preventing magnetic saturation at the pulse transformer.

47. (Previously Presented) A sputtering power supply unit according to claim 46, which further comprises a CR oscillation circuit supplied with an output from the comparator having the hysteresis characteristic, wherein the switching signal is supplied to the switching unit in accordance with an oscillation output from the CR oscillation circuit.

48. (Previously Presented) A sputtering power supply unit according to claim 43, wherein at least the operational amplifier and the division circuit are composed of a microcomputer.

49. (Currently Amended) A sputtering power supply unit according to claim 45, wherein ~~the operational amplifier,~~ the division circuit[[,]] and the sample/hold circuit are composed of a microcomputer.